

IN THE CLAIMS

1. (currently amended) A swivel joint apparatus for supplying utilities to a rotating building rotatable about a central axis, comprising:

a first, fixed member for securing to a fixed base of a rotating building to extend co-axially with the central axis of rotation of the building, the first member having a plurality of annular chambers each having an annular opening directed away from the first member;

a second member rotatably mounted on the first member for securing to a portion of the rotating building, the second member extending over the chamber openings in the first member to form rotating wall portions closing the respective chambers;

a plurality of seals between the first and second member for sealing the chambers;

the first member having a ~~plurality of first~~ first set of ports connected to the respective chambers for connection to fixed utility lines in the base of the building; and

the rotatable member having a ~~plurality of second~~ second set of ports connected to the respective chambers for connection of utility fluids to and from the rotating part of the building.

2. (currently amended) The apparatus as claimed in claim 1, wherein the first member comprises an inner, fixed ~~spindle~~ spool having a series of axially spaced, outwardly projecting annular flanges defining said annular chambers between each adjacent pair of flanges, each flange having an outer peripheral edge and at least one

ring seal mounted on the peripheral edge of each flange, the flanges having a predetermined outer diameter; and

the second member comprises an outer casing rotatably mounted on the ~~spindle~~ spool for securing to part of the rotating building, the casing having an inner diameter substantially equal to the outer diameter of the flanges, the casing forming an outer wall of each of the annular chambers and being in rotatable sealing engagement with each of the ring seals to seal the ~~chambers~~; chambers.

3. (currently amended) The apparatus as claimed in claim 2, wherein the ~~spindle~~ spool has a lower end wall, said first ports extending through said lower end wall, and a bore extending from each port through the ~~spindle~~ spool to a respective annular chamber, whereby each chamber is connected to at least one first port in the lower end wall; and

the second ports are provided at axially spaced locations on said casing, with at least one second port communicating with each of said annular chambers.

4. (currently amended) ~~The apparatus as claimed in claim 2, wherein~~ A swivel joint apparatus for supplying utilities to a rotating building rotatable about a central axis, comprising:

a first, fixed member for securing to a fixed base of a rotating building to extend co-axially with the central axis of rotation of the building, the first member having a plurality of annular chambers each having an opening directed away from the first member;

a second member rotatably mounted on the first member for securing to a portion of the rotating building, the second member extending over the chamber openings in the first member to form rotating wall portions closing the respective chambers;

a plurality of seals between the first and second member for sealing the chambers;

the first member having a first set of ports connected to the respective chambers for connection to fixed utility lines in the base of the building; and

the rotatable member having second set of ports connected to the respective chambers for connection of utility fluids to and from the rotating part of the building;

the first member comprising an inner, fixed spool having a series of axially spaced, outwardly projecting annular flanges defining said annular chambers between each adjacent pair of flanges, each flange having an outer peripheral edge and at least one ring seal mounted on the peripheral edge of each flange, the flanges having a predetermined outer diameter; and

the second member comprises an outer casing rotatably mounted on the spool for securing to part of the rotating building, the casing having an inner diameter substantially equal to the outer diameter of the flanges, the casing forming an outer wall of each of the annular chambers and being in rotatable sealing engagement with each of the ring seals to seal the chambers; and

each flange has having an outwardly directed, annular sensor chamber spaced outwardly from the ring seal, the outer casing has having a plurality of holes including at least one hole aligned with each of the sensor chambers, and a plurality of fluid sensors are mounted in the outer casing to project through the respective holes to sense any leakage of fluid past any of the seals.

5. (currently amended) The apparatus as claimed in claim 1, wherein one of the annular chambers comprises a sewer chamber for connecting rotating sewer lines within the rotatable building to fixed sewer lines within the base, the first member having more than one port ~~communicating~~ in continuous communication with the sewer chamber and the second member having a plurality of ports ~~communicating~~ in continuous communication with the sewer chamber.

6. (original) The apparatus as claimed in claim 5, wherein the annular chambers further include a water chamber for supply of water from a fixed water line in the base to water supply lines within the rotating building, and a gray water chamber for connecting at least one gray water drain line within the rotating building to gray water drain outlet line in the base.

7. (original) The apparatus as claimed in claim 6, wherein the annular chambers include a gas supply chamber for connecting a gas supply line in the base to gas supply lines within the rotatable building.

8. (currently amended) The apparatus as claimed in claim 2, wherein the annular flanges include two end flanges at opposite ends of the ~~spindle~~ spool forming an outer end wall of respective opposite end chambers, and a plurality of spaced intermediate flanges separating adjacent chambers along the length of the ~~spindle~~ spool, each intermediate flange having a pair of spaced ring seals projecting outwardly from its peripheral edge ~~for~~ in rotatable sealing engagement with said outer casing.

9. (currently amended) ~~The apparatus as claimed in claim 8, wherein~~ A swivel joint apparatus for supplying utilities to a rotating building rotatable about a central axis, comprising:

a first, fixed member for securing to a fixed base of a rotating building to extend co-axially with the central axis of rotation of the building, the first member having a plurality of annular chambers each having an opening directed away from the first member;

a second member rotatably mounted on the first member for securing to a portion of the rotating building, the second member extending over the chamber openings in the first member to form rotating wall portions closing the respective chambers;

a plurality of seals between the first and second member for sealing the chambers;

the first member having a first set of ports connected to the respective chambers for connection to fixed utility lines in the base of the building; and

the rotatable member having a second set of ports connected to the respective chambers for connection of utility fluids to and from the rotating part of the building;

the first member comprising an inner, fixed spool having a series of axially spaced, outwardly projecting annular flanges defining said annular chambers between each adjacent pair of flanges, each flange having an outer peripheral edge and at least one ring seal mounted on the peripheral edge of each flange, the flanges having a predetermined outer diameter;

the second member comprises an outer casing rotatably mounted on the spool for securing to part of the rotating building, the casing having an inner diameter substantially equal to the outer diameter of the flanges, the casing forming an outer wall

of each of the annular chambers and being in rotatable sealing engagement with each of the ring seals to seal the chambers;

the annular flanges include two end flanges at opposite ends of the spool forming an outer end wall of respective opposite end chambers, and a plurality of spaced intermediate flanges separating adjacent chambers along the length of the spool, each intermediate flange having a pair of spaced ring seals projecting outwardly from its peripheral edge for rotatable sealing engagement with said outer casing; and

each intermediate flange ~~has~~ having a sensor chamber between the pair of ring seals, and each end flange ~~has~~ having a sensor chamber outside the ring seal mounted on the respective end flange, and a plurality of fluid sensors are mounted on the outer casing to extend into the respective sensor chambers to detect leakage of fluid past any of the ring seals, the sensors having outputs for connection to a control unit within the rotatable building to provide an alarm signal in the event of failure of any of the seals.

10. (original) The apparatus as claimed in claim 9, wherein at least two sensors are provided in each sensor chamber.

11. (original) The apparatus as claimed in claim 9, wherein at least one of the annular chambers comprises a gas supply chamber for communicating a gas supply from the fixed base into the rotating part of the building, at least one chamber adjacent the gas supply chamber is a water chamber, and at least one water sensor and one gas sensor is provided in the sensor chamber between the gas supply chamber and water chamber.

12. (original) The apparatus as claimed in claim 1, including an electrical swivel assembly mounted above said first and second members, the electrical swivel

assembly comprising a fixed contact core secured to the first member and an outer rotating contact portion secured to the second member, the first and second members and contact core having aligned central through bores for passageway of fixed electrical power supply lines from the base of the building to the contact core and the outer contact portion having contacts for connection to power supply lines supplying power to fixtures within the rotating building.

13. (currently amended) The apparatus as claimed in claim 12 including a ~~rotary~~ rotating electrical connector mounted on said electrical swivel assembly for supply of electrical services to the rotating building, the rotary connector having a fixed ~~part~~ portion for connection to fixed electrical service lines extending through the aligned central through bores of the first and second members and electrical contact core, and a ~~rotary part~~ rotating portion rotatably mounted on the fixed part ~~and having conductors~~ for connection to electrical service lines within the rotating building, the rotary part being coupled to the outer rotating contact portion of the electrical swivel.

14. (currently amended) The apparatus as claimed in claim 1, wherein the first and second ~~parts~~ members comprise a lower fixed circular ~~plate~~ fixed circular member. The annular chambers comprising a series of radially spaced, upwardly directed annular grooves in said lower ~~plate~~ fixed circular member.

15. (currently amended) ~~The apparatus as claimed in claim 14, including~~ A swivel joint apparatus for supplying utilities to a rotating building rotatable about a central axis, comprising:

a first , fixed member for securing to a fixed base of a rotating building to extend co-axially with the central axis of rotation of the building, the first member having a plurality of annular chambers each having an opening directed away from the first member;

a second member rotatably mounted on the first member for securing to a portion of the rotating building, the second member extending over the chamber openings in the first member to form rotating wall portions closing the respective chambers;

a plurality of seals between the first and second member for sealing the chambers;

the first member having a first set of ports connected to the respective chambers for connection to fixed utility lines in the base of the building;

the rotatable member having a second set of ports connected to the respective chambers for connection of utility fluids to and from the rotating part of the building;

the first and second members comprising a lower fixed circular member and an upper circular plate rotatably mounted on the lower member, the annular chambers comprising a series of radially spaced, upwardly directed annular grooves in said lower member; and

an annular sensor chamber between each adjacent pair of annular chambers, and an annular sensor chamber spaced radially outwardly from the outermost annular utility chamber, and a plurality of upwardly facing circular seals mounted on said lower plate for rotatable sealing engagement with said upper plate, each seal being located between a respective sensor chamber and utility chamber.

Claims 16-31 (canceled)